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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/907,364	07/17/2001	Bo Su Chen	M40 01375 US	6467

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EXAMINER	
FUREMAN, JARED	

ART UNIT	PAPER NUMBER
2876	

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/907,364	CHEN, BO SU	
	Examiner	Art Unit	
	Jared J. Fureman	2876	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,7-10,12,14,16,18,19 and 21-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,7-10,12,14,16,18,19 and 21-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Receipt is acknowledged of the amendment, on 11/18/2004, which has been entered in the file. Claims 1, 3, 4, 7-10, 12, 14, 16, 18, 19 and 21-34 are pending.

Claim Objections

1. Claim 33 is objected to because of the following informalities: Claim 33, line 6, "surface" should be replaced with --surfaces--, in order to correspond with "surfaces" as recited in line 5.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3, 4, 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dalton et al (US 6,679,126 B2, previously cited) in view of Cui et al (US 6,399,940 B1, previously cited) and Renner et al (US 4,641,027, previously cited).

Dalton et al teaches a method for analyzing the performance of a system, comprising the steps of: directing light from at least one light source (150) towards identically encoded portions representing unconnected lines of a bar code formed on planar surfaces formed on and located near inner perimeter surfaces of two disks (first wheel 140a and second wheel 140b) independently rotatable on two shafts (drive shaft segments 110) representing input and output mechanism of the system; transmitting a

portion of the light towards a detector (160) after the light passes through the encoded portions (light that passes through the slits 142 on the first and second wheels); detecting a transmitted portion of the light using the detector; wherein the encoded portions comprise a bar code (the pattern of slits 142 on the first and second wheels can be considered a bar code, since the wheels will have portions of different reflectivity); wherein the encoded portions comprises at least one measuring feature (the slits 142) formed on a planar surface of the disks; shaping said encoded portion of said disks to increase transmission of said transmitted light in a particular direction (the slits 142 increase transmission of light, in that the light can pass through the wheels in the location of the slits); assessing said system utilizing said performance characteristic data; generating an electrical feedback signal from information recovered from said transmitted portion of the light (the detector 160 generates an electrical output); and providing said electrical feedback signal to an input of said system (a circuit, not shown, that receives the electrical output from the sensor), thereby improving said performance characteristic data of said system (see figures 1-3, column 4 line 66 - column 5 line 42, and column 7 lines 16-36).

Dalton et al fails to specifically teach directing collimated light; and the light source comprising a vertical cavity surface-emitting laser.

Cui et al teaches a method and apparatus for measuring the performance of a system, including the use of a vertical cavity surface-emitting laser (which naturally produces collimated light) (see column 7 lines 31-37).

In view of Cui et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Dalton, directing collimated light; and the light source comprising a vertical cavity surface emitting laser, in order to provide a compact laser diode for the light source, thereby reducing the size of the apparatus.

Dalton et al as modified by Cui et al fails to specifically teach transparent disks; and the light passing through the transparent disks and the encoded portions.

Renner et al teaches a method for analyzing the performance of a system, including transmitting light through encoded transparent disks (see figure 12 and column 13 line 65 - column 15 line 34).

In view of Renner et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Dalton et al as modified by Cui et al, transparent disks; and the light passing through the transparent disks and the encoded portions, in order to allow the disks to be made of plastic (see column 15, lines 14-19, of Renner et al), thus, utilizing an inexpensive and easily manufactured disk.

4. Claims 12, 14, 16 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinnock (WO 99/39169 A1, previously cited) in view of Cui et al and Renner et al.

Pinnock teaches an apparatus for analyzing the performance of a mechanical system including independently rotatable input and output shafts (shafts 2 and 4) with ends being separated by and coupled to a torsion bar (6), said apparatus comprising:

two disks (disk elements 10 or 12) independently attached near ends of the input and output shafts, wherein each of the disks include inward facing surfaces (see figure 1), the inward facing surfaces forming a gap between the two disks based on their placement on the ends of the input and output shafts (see figure 1); bar-code-like encoded portions (slots 16 or 18, having a higher optical transmissivity) formed on the inward facing surfaces of the two disks; at least one directing element (a diffuser, not shown) that directs light (from light source 20) through the two disks in order to intercept the bar-code-like encoded portions, wherein a portion of light is transmitted through the bar-code-like encoded portions of the two disks; and at least one detector or sensor plate (sensor array 22) to receive the transmitted portion of light; recovery mechanism (data processor 24) that recovers information about a performance characteristic of said mechanical system from the at least one detector or sensor plate; wherein the directing element comprises an optical lens (the diffuser represents an optical lens); wherein the bar-code-like encoded portion of the rotating disk comprises a bar code (disk element 12 includes slots 18 representing a portion of disk element 12 having higher optical transmissivity than the portions ("spokes") which separate the slots, thus, the encoded portion can be considered a bar code) (see figures 1-7, page 2 line 4 - page 3 line 7, and page 7 line 6 - page 10 line 8).

Pinnock fails to specifically teach the light source comprising a vertical cavity surface-emitting laser.

Cui et al teaches a method and apparatus for measuring the performance of a system, including the use of a vertical cavity surface-emitting laser (see column 7 lines 31-37).

In view of Cui et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Pinnock, the light source comprising a vertical cavity surface emitting laser, in order to provide a compact laser diode for the light source, thereby reducing the size of the apparatus.

Pinnock as modified by Cui et al fails to specifically teach transparent disks; and the light passing through the transparent disks and the encoded portions.

Renner et al teaches a method for analyzing the performance of a system, including transmitting light through encoded transparent disks (see figure 12 and column 13 line 65 - column 15 line 34).

In view of Renner et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Pinnock as modified by Cui et al, transparent disks; and the light passing through the transparent disks and the encoded portions, in order to allow the disks to be made of plastic (see column 15, lines 14-19, of Renner et al), thus, utilizing an inexpensive and easily manufactured disk.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dalton et al as modified by Cui et al and Renner et al as applied to claim 1 above, and further in view of Burke, Jr (US 3,688,570, previously cited).

Dalton et al as modified by Cui et al and Renner et al fails to specifically teach transmitting at least one light beam from said encoded portions of said disks to interact with at least one other light beam to form Moiré fringes on a sensor.

Burke, Jr teaches a method and apparatus for analyzing the performance of a system, comprising: a first encoded rotating member (shell 14), a second encoded rotating member (shell 22), a light source (32) generating a light beam, a sensor/detector (48, 53) receiving a light beam from the first encoded member and a light beam from the second encoded member to form Moiré fringes on the sensor/detector as a result of the interaction of images from the first and second encoded portions of the first and second rotating members (see figures 1A, 1, 2, 4, column 1 lines 4-6, 59-67, and column 2 line 56 - column 5 line 64).

In view of Burke, Jr's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method as taught by Dalton et al as modified by Cui et al and Renner et al, transmitting at least one light beam from said encoded portions of said disks to interact with at least one other light beam to form Moiré fringes on a sensor, in order to take advantage of the sensitivity and displacement amplification capabilities of the Moiré fringe system (see column 3 lines 40-45 of Burke, Jr).

6. Claims 18, 19, 21-32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinnock in view Cui et al, Renner et al and Burke, Jr.

The teachings of Pinnock have been discussed above. Pinnock also teaches an apparatus for detecting the relative motion between at least two rotating members in a

mechanical system, comprising: a light source (20) for generating a light beam; a first encoded portion (slot 16) representing unconnected lines of a bar code located on surface of a first disk (disk element 10), the first encoded portion facing a second encoded portion (slot 18) also representing unconnected lines of a bar code located on a surface of a second disk (disk element 12), the first and second encoded portions used for the transmission of images towards at least one of a sensor plate or detector (sensor array 22) that are created using said light beam; and at least one detection mechanism comprised of at least one sensor plate or photodetector (sensor array 22) for receiving the light beam, wherein said detection mechanism is located proximate to said mechanical system opposite the light source, and wherein the light beam transmitted by the light source travels through the disks to the detection mechanism; a collimating lens (a diffuser, not shown) located proximate said light source, wherein said collimating lens renders the light beam from said light source into a highly collimated parallel light beam, thereby directing said highly collimated parallel light beam to intercept said encoded portion on said first rotating member; wherein said at least one encoded portion comprises: a transparent polymer film (annular overlay 100) having parallel lines resembling an opaque bar code imprinted on an upper surface of said transparent polymer film; and wherein said opaque parallel lines are spaced evenly with a width of a gap formed therebetween, wherein the width of the gap corresponds to the width of said opaque parallel lines; and wherein said transparent polymer film is fixed to a rotating member (disk element 12); wherein said transparent polymer film comprises a bar code when adhered to a rotating disk; wherein said light

beam intercepts said first and second encoded portions of said rotating members at an angle of incidence of about 90.degree.; and wherein said light beam carries an image of said bar code after being transmitted over said encoded portions of said first and second rotating members; wherein said detector is located on a sensor (the sensor array 22 contains many detectors); wherein said encoded portion of the first rotating member is shaped to increase said transmitted light in a particular direction; wherein said encoded portion of the first rotating member is shaped to form an optical encoder for encoding information representing performance characteristics of said system; wherein said encoded portion of the first disk is provided as a vernier on said first disk to increase accuracy for sensing motion of rotating members (shafts 2 and 4) in the mechanical system; wherein said encoded portion of the first rotating member comprises features recessed (the slots 16 and 18 are recessed into the surface of the disk elements 10 and 12, respectively) into a surface or edge of said rotating member (see figures 1-7, page 2 line 4 - page 3 line 7, and page 7 line 6 - page 10 line 8).

Pinnock fails to specifically teach the light source comprising a vertical cavity surface-emitting laser.

Cui et al teaches a method and apparatus for measuring the performance of a system, including the use of a vertical cavity surface-emitting laser (see column 7 lines 31-37).

In view of Cui et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Pinnock, the light source comprising a vertical cavity surface emitting laser,

in order to provide a compact laser diode for the light source, thereby reducing the size of the apparatus.

Pinnock as modified by Cui et al fails to specifically teach transparent disks; and the light passing through the transparent disks and the encoded portions.

Renner et al teaches a method for analyzing the performance of a system, including transmitting light through encoded transparent disks (see figure 12 and column 13 line 65 - column 15 line 34).

In view of Renner et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Pinnock as modified by Cui et al, transparent disks; and the light passing through the transparent disks and the encoded portions, in order to allow the disks to be made of plastic (see column 15, lines 14-19, of Renner et al), thus, utilizing an inexpensive and easily manufactured disk.

Pinnock as modified by Cui et al and Renner et al fails to specifically teach transmitting at least one light beam from said encoded portions of said disk to interact with at least one other light beam to form Moiré fringes on a sensor; the detector detecting Moiré fringes formed as a result of the interaction of images from said first and second encoded portions of said first and second disks.

Burke, Jr teaches a method and apparatus for analyzing the performance of a mechanical system, comprising: a first encoded disk (shell 14), a second encoded disk (shell 22), a light source (32) generating a light beam, a sensor/detector (48, 53) receiving a light beam from the first encoded disk and a light beam from the second

encoded disk to form Moiré fringes on the sensor/detector as a result of the interaction of images from the first and second encoded portions of the first and second disks (see figures 1A, 1, 2, 4, column 1 lines 4-6, 59-67, and column 2 line 56 - column 5 line 64).

In view of Burke, Jr's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Pinnock as modified by Cui et al and Renner et al, transmitting at least one light beam from said encoded portions of said disk to interact with at least one other light beam to form Moiré fringes on a sensor; the detector detecting Moiré fringes formed as a result of the interaction of images from said first and second encoded portions of said first and second disks, in order to take advantage of the sensitivity and displacement amplification capabilities of the Moiré fringe system (see column 3 lines 40-45 of Burke, Jr).

Response to Arguments

7. Applicant's arguments with respect to claims 1, 3, 4, 7-10, 12, 14, 16, 18, 19 and 21-34 have been considered but are moot in view of the new ground(s) of rejection. As discussed above, Renner et al teaches the use of transparent disks.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared J. Fureman whose telephone number is (571) 272-2391. The examiner can normally be reached on 7:00 am - 4:30 PM M-T, and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee can be reached on (571) 272-2398. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jared J. Fureman
Examiner
Art Unit 2876

February 7, 2004